

FORM PTO-1390 (Modified)
(REV 11-98)

U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

RCA 89130

U.S. APPLICATION NO. (IF KNOWN, SEE 37 CFR

09/743997

INTERNATIONAL APPLICATION NO.
PCT/US99/16187INTERNATIONAL FILING DATE
15 July 1999 (15.07.99)PRIORITY DATE CLAIMED
22 July 1998 (22.07.98)

TITLE OF INVENTION

USE OF ON-SCREEN DISPLAY (OSD) FOR SUPPLYING CONTROL AND AUXILIARY
INFORMATION TO EXTERNAL DEVICES

APPLICANT(S) FOR DO/EO/US

Henry William Mengel

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☒ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ A copy of the International Search Report (PCT/ISA/210). attached to Item 13
8. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
9. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
10. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
11. ☒ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371 (c)(5)).

Items 13 to 20 below concern document(s) or information included:

13. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98. with references attached
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☒ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☒ Certificate of Mailing by Express Mail
20. Return postcard receipt

20. ☒ Other items or information: **CERTIFICATE OF MAILING UNDER 37 CFR 1.10**

EL667108796US

17 January 2001

"Express Mail" mailing no.

Date of Deposit

I hereby certify that this application is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

Dauida Fornarotto
Typed or printed name of person
mailing application

Dauida Fornarotto
Signature of person mailing
application

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Henry William Mengel
Filed : Herewith
For : USE OF ON-SCREEN DISPLAY (OSD) FOR SUPPLYING
CONTROL AND AUXILIARY INFORMATION TO
EXTERNAL DEVICES

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Sir:

In the US national phase application of PCT/US99/16187 filed
herewith, please enter the following amendments:

IN THE ABSTRACT:

Please add the following Abstract.

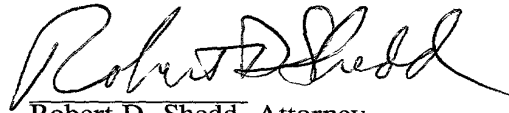
--Control or other information may be added to a video signal having no blanking intervals, as from a digital satellite receiver, a digital television converter/set-top box or the like, and decoded and utilized by a receiving external device, through utilization of the OSD capabilities of the receiver and external device. The information is insertable during non-blanking of the video and can be utilized to convey control information, signatures/watermarks, or the like from the receiver to the external device. Thus, the OSD can be used to deliver control or other information usually included in the blanking interval of an analog television signal by including the control or other information in non-blanking portions. A device external to the device providing the OSD capability will receive the data in the non-blanking region and process the data to obtain the required information.--

REMARKS

To meet the requirements of the United States, the Abstract (as originally filed in the PCT application) is added.

No fee is believed to have been incurred by virtue of this amendment. However if a fee is incurred on the basis of this amendment, please charge such fee against deposit account 07-0832

Respectfully submitted,
William Henry Mengel



Robert D. Shedd, Attorney
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609/734-9517

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January 16, 2001

USE OF ON-SCREEN DISPLAY (OSD) FOR SUPPLYING
CONTROL AND AUXILIARY INFORMATION TO EXTERNAL DEVICES

CROSS-REFERENCE TO RELATED APPLICATIONS

5 This is a non-provisional patent application based on co-pending
provisional patent application serial number 60/093,699 filed July 22, 1998.

BACKGROUND OF THE INVENTION

1. Field of the Invention

10 The present invention relates to digital video signal processing and, more
particularly, to a scheme for providing control information in a digital data
stream.

2. Description of the Related Art

15 In analog television systems, certain auxiliary information such as closed
captioning, extended data service (XDS), vertical interval test signal (VITS), and
the like, is included in an analog signal in the form of data inserted into the
vertical blanking interval (VBI). In digital television or multi-media systems, the
traditional analog vertical and horizontal blanking areas or intervals and the
information contained in those areas may not be transmitted as part of the
picture information.

20 In the digital domain, auxiliary information such as that found in the
blanking portions of an analog signal is typically transmitted and processed
independently of the received video information. For example, a digital television
signal or direct broadcast satellite (DBS) signal such as that provided by
DirecTV™, provides a stream of digital data arranged in "packets", thus the term
25 packetized data. The packetized data is received and processed by a digital
signal receiver. Some packets provide video information, other packets provide
audio information, and still other packets provide control and/or auxiliary
information such as closed caption data. Additional information contained in
each packet identifies the type of data included in each packet. The receiver
30 processes the packets and generates video, audio, and auxiliary information
signals.

The analog output signal may be provided in any format such as NTSC, PAL or other standard, and is produced by converting the digital signal to an analog signal and processing the analog signal in an encoder (NTSC, PAL, etc.) circuit. In the United States, the digital signal is converted into an NTSC standard analog signal and will be referred to hereafter as such with the understanding that such reference encompasses other types of encoded analog signals. The digital signal can also be output as an RGB (red, green, blue) signal or component Y, Pr, Pb or Y, Cr, Cb signals.

As the NTSC analog output signal is generated by the NTSC encoder circuit, vertical and horizontal blanking regions are produced in the signal. If required, auxiliary information received as packetized data in the digital signal may be inserted in the appropriate portions of the analog signal. For example, closed caption (CC) information is inserted into line 21 of field 1, as implemented in the U.S. NTSC system. The resulting NTSC signal may then be coupled to a conventional analog television (video) signal receiver and the closed captioning information may be decoded using a conventional closed caption decoder included in the analog television signal receiver. However, depending on the capabilities of the broadcast network and the digital receiver/decoder, it may not be possible to include some or any of the auxiliary information in the blanking intervals generated by the digital receiver. In addition, a video receiver having an RGB component or similar output may not have blanking intervals and as a result cannot include auxiliary information in the conventional manner.

In addition to CC, XDS, and other auxiliary information delivered in the blanking intervals of an analog video (television) signals, the analog video signals may also include control information such as what is known as the Copy Guard Management System (CGMS). CGMS has been developed to permit receiving devices to control the recording and copying of programming. The CGMS scheme provides two bits that are included in a program signal to indicate one of four different record/copy modes that is permitted for the program. For example, one mode prohibits copying. Another mode permits one copy to be made. Another mode permits unlimited copying. In analog television signals, the required copy control information can be provided to the receiver in the vertical

blanking interval. Other coding/data/information delivery schemes may also utilize blanking intervals. In receivers receiving digital signals or analog signals without blanking intervals or in systems lacking encoders capable of inserting the information in generated blanking intervals, providing required control information such as copy control information that can be detected and processed by other devices becomes problematic. Even if the signal includes blanking intervals, including additional control information such as copy control information may be difficult or impossible for systems that require adding a significant amount of control data to the already substantial amount of data that may already be included in blanking intervals.

Most current video or television reception devices, whether analog or digital, now include on-screen display (OSD) capability for generating messages that appear in the displayed video image and convey information, such as channel number, time, and the like to a user. The typical OSD generator can manipulate the color and/or palette of each pixel as well as control whether the pixel is on or off. A typical OSD also includes a microprocessor generating desired graphics or character display information, e.g. the microprocessor accesses a character generator ROM, and inserting the display information into the output signal at the appropriate time to produce the OSD display in the desired region of the display. To insert the OSD information at the correct time, the systems can use the video synchronization signals to track the current display location by determining the pixels per line (horizontal display position) and line intervals (vertical display position). When the line count and pixel count indicate that the display has reached a location where OSD information is to be inserted, the microprocessor controls a fast switch to couple the OSD information to the output signal.

What is needed in the art is a way for providing control and auxiliary information in systems producing signals lacking blanking intervals.

As well, what is needed in the art is a way for providing control and auxiliary information in systems unable to include such information in blanking intervals.

SUMMARY OF THE INVENTION

The problem described above of providing control and/or auxiliary information in systems producing signals lacking blanking intervals or in systems unable to include control and/or auxiliary information in blanking intervals, is overcome with the present invention by using a resident OSD feature to insert control or other information such as signatures or watermarks during non-blanking portions of the signal, e.g. active display intervals.

An OSD system can be controlled e.g. via software, to insert information at any location in the display region through the video signal. Thus, the OSD system can be utilized to mirror or deliver the control and/or auxiliary information usually included in the blanking interval of an analog television signal into the non-blanking portions of the signal. As an example, for signals outputted as an RGB signal, the OSD by manipulating the pixels would insert a visual depiction of the data representing the desired control or auxiliary information during portions of the output signal corresponding to the desired non-blanking portion of the signal. Then, a device external to the device providing the OSD capability, e.g. a video display device coupled to the output of a digital receiver, a VCR, or other recording/playback device coupled to the output of a digital receiver, will receive the data representing the desired information in the non-blanking region and process the data to obtain the required control and/or auxiliary information. The obtained information may be acted upon or otherwise by the external device.

For certain systems, the OSD could repeat auxiliary or control information in the non-blanking regions to provide for decoding by systems in which decoding of information within the blanking area is not practical or desired. In other systems, the OSD could generate or duplicate the information typically found in blanking areas into non-blanked areas in a similar format. In addition, the chroma and luminance capabilities of the OSD can be utilized to further expand the data handling capabilities since the OSD is capable of determining the characteristics of individual pixels.

The information inserted by the OSD in the non-blanking regions may be inserted in a manner that will not produce an objectionable display. For example, the OSD can insert the information during an active display region that is in an

overscan region. If the amount of information is extremely limited or static, e.g. two bits of copy control information (CGMS), such auxiliary or control information could be inserted in the visible display region without causing objectionable display artifacts.

5 In accordance with an aspect of the present invention, a video receiver's built-in OSD can be utilized to generate or emulate control and/or auxiliary information of any other data or information traditionally delivered along with the video information in the blanking areas in a similar format in the non-blanked portions of the video signal for decoding by external devices when decoding of
10 information within the blanking areas is not possible, practical or desired. Such can be implemented in software to control the OSD.

The information can be duplicated in the non-blanking portions of the video for decoding by external devices when decoding of information within the blanking areas is not practical or desired.

15 BRIEF DESCRIPTION OF THE DRAWINGS

The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of an embodiment of the invention taken in conjunction with the accompanying
20 drawings, wherein:

Fig. 1 is a block diagram of a digital video receiver in accordance with the principles of the present invention; and

Fig. 2 is a block diagram of an external device or module couplable to the output of the digital video receiver of Fig. 1 in accordance with the principles of
25 the present invention.

Corresponding reference characters indicate corresponding parts throughout the several views. The exemplification set out herein illustrates a preferred embodiment of the invention, and such exemplification is not to be construed as limiting the scope of the invention in any manner.

30 DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings and, more particularly to Fig. 1, there is shown a simplified, functional block diagram of a video receiver generally

designated 10 in accordance with the principles of the present invention.

Receiver 10 can be any type of video signal receiver such as a DBS receiver, a converter/set-top box or the like that is adapted to receive via input 12 a radio frequency (RF) digital signal. The source(s) of input signal may be via satellite, cable system, over-the-air, or otherwise and may or may not contain control information, signature information, XDS, CC, or the like.

Receiver 10 has RF tuner/demodulator/link 16 that receives the digital signal via input 12 and which contains circuitry for such reception as well as for the selection of an input signal or channel from the incoming digital signal, digital demodulation of the signal, Forward Error Correction (FEC) decoding, and the outputting of the decoded data. Tuner/demodulator/link 16 is in communication with transport portion 18 that provides a first level of decoding of the error corrected data received from tuner/demodulator 16. Essentially, such first level decoding comprises routing the received data/information to the appropriate destination device within receiver 10 for further processing, e.g. audio data/information to the audio decoder, and video data/information to the video decoder and so forth. In the case of video, transport 18 forwards the video information to video decoder 22, typically an MPEG video decoder. MPEG video decoder 22 is a real-time video decompression processor that decodes and processes the MPEG compressed data. MPEG video decoder 22 is in communication with microprocessor or controller 20 and any internal or external memory (not shown) as may be necessary to provide the necessary decoding and processing functions. Also, microprocessor 20 is in communication with RAM and/or ROM. Microprocessor 20 is coupled to the other shown modules or devices within receiver 10 as well as those not shown via link 28 as necessary to receive and process the incoming audio and video signals.

As shown in Fig. 1, MPEG video decoder 22 includes an integral OSD generator 24, however, it should be understood that the OSD generator may be separate from the MPEG video decoder. OSD generator 24 provides bit-map capabilities to manipulate color and palette of each pixel, as well as whether the pixel is on or off, for overlaying same on any portion of the display, including blanking, while video decoding proceeds simultaneously. Palette registers may

be selected and loaded with any color or with a value to indicate transparent pixels.

In accordance with an aspect of the present invention, microprocessor 20 supplies appropriate control, data, signature, and similar information (collectively control information) as is desired per appropriate software to OSD 24 for inclusion as OSD data/information into the video signal. Any data/information received by receiver 10, such as CGMS information, may be inserted into the video signal as an OSD signal during non-blanking intervals. Data or information not received by receiver 10 through non-inclusion of same in the incoming signal or unable to be processed by receiver 10, may be inserted into the video signal as internally generated (emulated) OSD data/information. Of course, any data/information delivered as an OSD signal will be displayed on the display device (external device). However, while such information may be displayed, it may not necessarily be viewable if such information is in an overscan area, or contained in various individual pixels throughout a display portion or the entire display area which would not be readily discerned by the eye.

MPEG video decoder 22 is in communication with video digital to analog (D/A) converter 26 that converts the digital video signal, with or without OSD data/information including OSD coded data/information in accordance with the present principles, into an analog video signal without synchronization signals. Synchronization signals are generated within receiver 10 and outputted as a separate signal from the video signal. Video D/A converter 26 contains three digital-to-analog converters to convert the Y, Cr, and Cb video data signals from MPEG video decoder 22 into Y, Pr, and Pb video signals. If necessary, the Y, Pr, and Pb signals may be matrixed as is known in the art to provide an RGB (video) output signal. In this case, the video signals would also include any OSD data/information. Video D/A converter 26 has output 14 that provides the analog video representation of the digital video information received by receiver 10 and any OSD data/information including any coded, emulated, or imbedded data/information.

Thus, the OSD of a video receiver is utilized to transmit data or information to an external device that separately processes the OSD data or

information during real-time video processing which can then be used by the external device for device control or otherwise. This is accomplished, at least in part, by appropriate software for the video receiver.

With reference now to Fig. 2, there is shown external device or module 30 that can be incorporated into a VCR or other recording/playback device, television/monitor, or the like that receives and utilizes video signals and of course, is separate from receiver 10. External device 30 includes video input 32 that feeds into detector 38. In this case, detector 38 is adapted to receive the Y, Pr, and Pb or RGB video signals and provide output signals that correspond to the chroma and luminance values of each pixel, in essence processing the video signals including the OSD data/information included with those signals. As well, external device 30 includes sync input 34 which is provided by receiver 10 as a separate signal. Video synchronization signals are used for determining the location of pixels on the video signal. Counter and/or timing circuits 40 are utilized to identify any position on the display (or bit-mapped area constituting what would be a display) to which a characteristic or value has been assigned, such as palette, color, on/off, or the like. Thus, any individual pixel, line of pixels, group of pixels, pattern of pixels, or the like may be identified by its characteristics as given to it by OSD 24 of receiver 10. Microprocessor 44, typically in communication with RAM and ROM, may be in communication with detector 38 and counter/timer 40 and under direction of appropriate software to ascertain, understand, and process the code, data, or information contained in the OSD data/information and/or to add intelligence to the processing.

Detector 38, microprocessor 44, and counter/timer 40 are in communication with output gate 42 that provides gating of the detector output signal (e.g. the chroma and luminance value present at a location or group of locations) with the counter/timer output as appropriate to supply a signal to output 36, typically a logic or voltage level signal. The output signals which correspond to the OSD data/information can then be utilized for any purpose.

One purpose may be to display a watermark or message that may be pre-stored, for example, in the ROM of a VCR or video display device that incorporates external device 30, or through controlling the characteristics of various pixels at

some point or points during the video. Another purpose may be to use the signal as a means of control of yet another device or scheme that could, for example, limit or prohibit the copying, recording, or other function of the other device. As well, broadcasters at the signal source may insert data/information into the non
5 blanked portions of the video signal that can be detected and utilized by the present invention.

While this invention has been described as having a preferred design, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses,
10 of adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

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WHAT IS CLAIMED IS:

1. A method of communicating non-video data from a video receiver to an external device, the video receiver adapted to receive a digital video signal and output an analog video signal derived from the digital video signal; the method comprising:
 - providing the non-video data to an OSD generator of the video receiver;
 - formatting the non-video data as OSD data;
 - inserting the OSD data into the analog video signal;
 - providing the external device with an OSD data detector;
 - detecting the OSD data to receive the non-video data.
2. The method of claim 1, wherein the OSD data is inserted into the analog video signal during non-blanking portions.
3. The method of claim 1, wherein the non-video data is control data.
4. The method of claim 1, wherein the non-video data is information usually included in a blanking interval of an analog video signal.
5. The method of claim 1, wherein the non-video is contained in the digital video signal.
6. The method of claim 1, wherein the non-video data is determined by the video receiver.
7. The method of claim 1, wherein the OSD data is displayable in an overscan region.
8. The method of claim 1, wherein the video receiver provides a sync signal to the external device.

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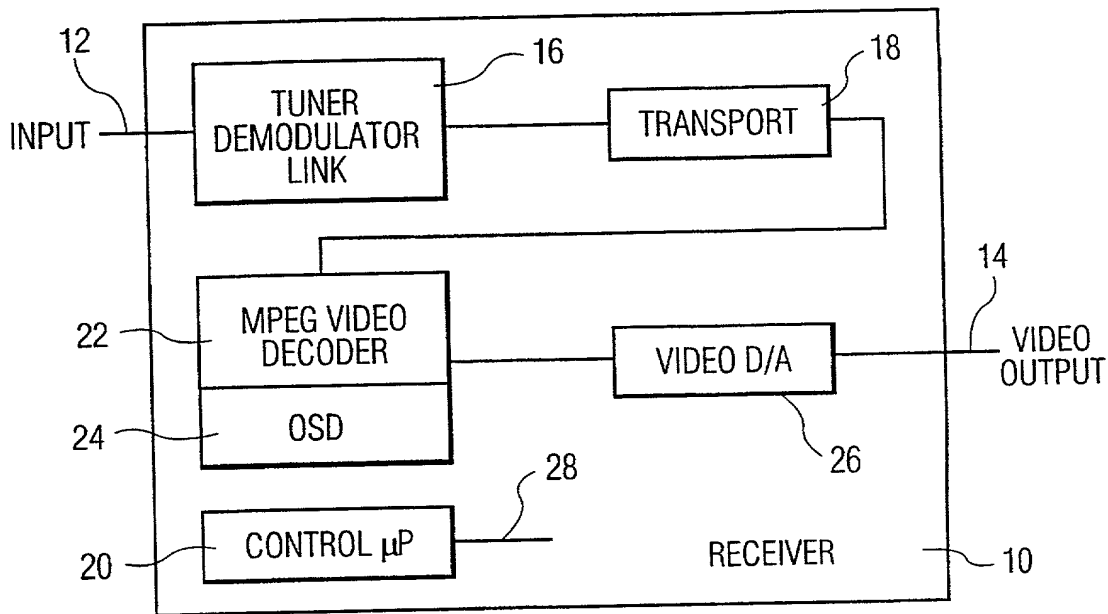


FIG. 1

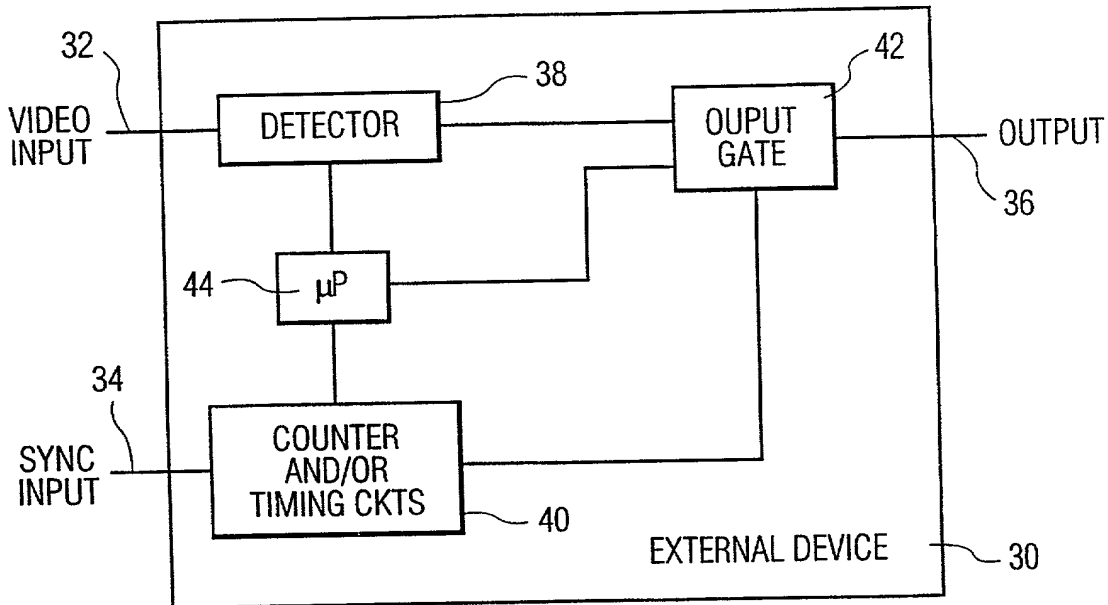


FIG. 2

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PTO/SB/01 (10-00)

Approved for use through 10/31/2002. OMB 0651-0032

Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)	Attorney Docket Number	RCA 89130
	First Named Inventor	William Henry Mengel
	COMPLETE IF KNOWN	
	Application Number	/
	Filing Date	
	Group Art Unit	
<input type="checkbox"/> Declaration Submitted with Initial Filing	OR	<input checked="" type="checkbox"/> Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16(e)))
	Examiner Name	

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

USE OF ON-SCREEN DISPLAY (OSD) FOR SUPPLYING CONTROL AND AUXILIARY INFORMATION TO EXTERNAL DEVICES

the specification of which (Title of the Invention)

☐ is attached hereto

OR

☒ was filed on (MM/DD/YYYY) **July 15, 1999** as United States Application Number or PCT International

Application Number **PCT/US99/16187** and was amended on (MM/DD/YYYY) **April 18, 2000** (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above:

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign	Foreign Filing Date	Priority	Certified Copy Attached?	
			YES	NO
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

☐ Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	
60/093,699	July 22, 1998	<input type="checkbox"/> Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

[Page 1 of 2]

Burden Hour Statement: This form is estimated to take 21 minutes to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant Commissioner for Patents, Washington, DC 20231.

DECLARATION — Utility or Design Patent Application

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Correspondence address below

Name JOSEPH S. TRIPOLI - PATENT OPERATIONSAddress THOMSON multimedia Licensing Inc.Address PO Box 5312City PRINCETONState NJZIP 08540Country USTelephone 609-734-9517Fax 1-609-734-9700

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR :

☐

A petition has been filed for this unsigned inventor

Given Name

(first and middle [if any]) WILLIAM HENRY

Family Name

or Surname MENGELInventor's
SignatureWilliam Henry MengelIN

Date

1/29/01Residence: City CARMELState INCountry USCitizenship USMailing Address 846 West 146th Street

Mailing Address

City CarmelState INZIP 46032Country US

NAME OF SECOND INVENTOR:

☐

A petition has been filed for this unsigned inventor

Given Name

(first and middle [if any])

Family Name

or Surname

Inventor's
Signature

Date

Residence: City

State

Country

Citizenship

Mailing Address

Mailing Address

City

State

ZIP

Country

☐ Additional inventors are being named on _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.